

RAFT IDEAS

Topics: Animal Cell Structure, Modeling

Materials List

- ✓ Fabric strips, any size
- ✓ Foam, various types
- ✓ Clear plastic containers (e.g., clamshell-type)
- ✓ Packing peanuts
- ✓ Cardboard
- ✓ Cardstock
- ✓ Coffee stirrers, plastic (any color)
- ✓ Glue
- ✓ Scissors
- ✓ Markers or crayons
- ✓ Optional: Marbles, beads, chenille stems, buttons
- ✓ Illustration of an animal cell (see page 2)

This activity can be used to teach:

- Cell Biology (CA Science Standards: Grade 7, 1.a - 1.d)
- Structure of Living Systems (CA Science Standards: Grade 7, 5.a)
- Fundamental Life Processes (CA Science Standards: HS Biology, 1.a, 1.c, 1.d)

Animal Cells

Modeling cell structure



Gain a deeper understanding of the structures and functions found in animal cells by creating a model from repurposed materials.

To Do and Notice

1. Examine the attributes, such as color, flexibility, weight, and texture, of each type of item that is available.
2. Based upon the items' attributes choose an item to represent each type of organelle found in the animal cell. Refer to animal cell illustration on the next page to help inspire creativity and the table below for information.
3. Construct an animal cell model using the selected items.
4. Explain the choices of material used for the organelles to a partner or group.

Organelle	Function
Cell membrane	Provides fluidity, protection, and nutrient transport
Endoplasmic reticulum (ER)	Material transport, involved in protein & lipid synthesis
Golgi body (apparatus)	Packages, sorts, and modifies molecules used by cell
Lysosome	Digests waste materials including "dead" organelles
Mitochondrion	Converts food to energy (ATP) using enzymes
Nucleus	Controls cell functions, contains DNA
Nucleolus	Produces ribosome subunits
Ribosome	Protein synthesis, made of two protein-based subunits
Vacuole	Food or waste storage

The Science Behind the Activity

Modeling provides an opportunity for students to translate and to communicate scientific information in a meaningful way that strengthens observation skills. Social interaction and summarization skills are strengthened when the student explains the selection process used in building the student's model.

All organisms, animals and plants, are composed of cells. Cells were discovered in 1665 by English scientist Robert Hooke when he used a microscope to examine a piece of cork. Cells contain smaller parts, called organelles, each with specific functions. Almost all living things are eukaryotic (meaning "true nucleus") and contain genetic material in an organelle called the nucleus. Other types of organelles found in animal cells (and plant cells) and their functions are summarized in the table.

There are many unique types of animal cells, such as skin, nerve, brain, and sex cells. Each cell type is structured to perform a particular function and examining the structure can reveal details about that specific function. For example, nerve cells, called neurons, consist of a cell body and long attachments, called axons, which conduct nerve impulses while shorter attachments, called dendrites, receive impulses.

Sensory cells are those that detect information about an organism's external environment and transmit that information to the brain. The rod cells in the retina of the eye look like no other cell in the body. Rod cells have regions that contain discs filled with light-sensitive pigments. Exposure to light causes chemical changes in the pigments and in this way allows animals to detect light.

Animal and plant cells have a semi-permeable cell membrane surrounding the cell. Water and other molecules can pass easily into and out of the cell through the cell membrane. The cell membrane regulates the flow of material based on the particle size and the other molecular properties of the material. Plant cells have an additional cellulose wall surrounding the cell that adds structural support. Animal cells must, ultimately, obtain food from the environment as the cells do not have the chloroplasts found in plants. Chloroplasts allow plants to photosynthesize, take carbon dioxide molecules from the air and convert them into sugars and other organic molecules. Both animal and plant cells metabolize food in the mitochondria of the cell.

Taking It Further

- Obtain a list of common animal cell types and describe the relationships between the cell structures and functions.
- Model a plant cell - see RAFT Idea Sheet *Plant Cells*.

Web Resources (Visit www.raft.net/more for how-to videos and more ideas!)

- An excellent illustration of animal cell structure can be found at: <http://www.enchantedlearning.com/subjects/animals/cell/anatomy.GIF>
- Detailed information regarding organelle function and physiology can be found at: <http://www.tvdsb.on.ca/WESTMIN/science/sbi3a1/Cells/endo.htm>, <http://www.cellsalive.com/index.htm> & <http://library.thinkquest.org/12413/structures.html>

